

SUMMARY OF RESULTS THAT CAN BE OBTAINED BY IRRADIATION IN CANCER*

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The progressive increase in Cancer requires that every physician shall do everything in his power toward the prevention or cure of cancer. Even at present much can be done to prevent cancer, as I have indicated in a previous paper,¹ if everyone makes use of all the knowledge that is now available. This requires among other things that every physician be on the alert for the diagnosis of precancerous lesions, and that he help in the individual instruction of patients as to danger signals.

One of the first essentials in the instruction and care of patients for the prevention and cure of cancer is a knowledge of what can be accomplished by each method or means for the treatment of cancer. Your officers have therefore asked me to give you a summary of what can be accomplished by irradiation. You will understand, therefore, that my silence as to the great value of surgery is obligatory for want of time. I take it that you do not want to know just the general average of results that are being obtained, nor the results of poor judgment and bad technique, but rather the best that can be accomplished by those who have made a careful study of both cancer and the principles of radiology, and who have used the best known technique. It is also advisable that surgery should be considered from the same standpoint, and then it is clearly the duty of all who undertake the treatment of cancer to learn and apply the same principles and technique. This will lead to real progress.

In my opinion, the field for irradiation therapy will always be limited, especially in dealing with cancer of the

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¹Pfahler:—Can We Prevent Cancer?—*Monthly Bulletin* of the Department of Health of the City of Philadelphia, Jan.-Feb. 1932.

viscera, because of the difficulties in protecting the essential organs. Wherever irradiation is useful it is self-evident that a small localized area of disease will be more successfully treated than a large or widely scattered area. Until recently, for the most part, it was the advanced cases that have been referred for irradiation, and it was only by producing results on such cases that earlier ones have been treated and better results obtained. The summary which you request can probably be best made by discussing cancer affecting the various organs, in the order in which most has been accomplished by irradiation, as follows: Skin, Lip, Mouth, Uterus, Breast, Tonsil and Pharynx, Larynx, Lungs, Lymphatics, Bone, Brain, and Gastro-Intestinal Tract.

Cancer of the Skin in its early stages, while it still involves only the skin, can be cured in almost 100 per cent by a skilful combination of electrocoagulation and irradiation. It is true that this results in a slight scar, which in my opinion is of no significance. When the roentgen rays are used alone, it requires about four erythema doses. This however is safe to give if the lesion is small. This roentgen ray treatment will usually leave slight atrophy of the skin. When radium is used about four erythema doses will also be required, and often by this means the lesion can be eliminated without scar, especially if given in divided doses. *When an epithelioma has extended into the deeper tissues—cartilage, fascia, muscle, or bone, it is correspondingly difficult to get the patient well, and while the disease may be temporarily eliminated ultimate failure is a common result.*

Early, thorough and skilful treatment is therefore the keynote to success in the treatment of cancer of the skin as with cancer elsewhere in the body. If all the knowledge now available is utilized by both the laity and the profession, nearly all cancers of the skin should be prevented, and practically all can be cured. I have not failed in any case in which the disease had not invaded the deep tissues at the time when the patient first came. Statistics show

a variation of cures by means of irradiation of from 53 per cent (E. G. Williams) to 100 per cent (Dolloway). The variation is due to the extent of the disease at the time of treatment, and to the technique used. In unselected cases, the cures under skilful irradiation amount to 90 per cent (MacKee).

Cancer of the Lip is usually located at the junction of the skin and the mucous membrane or on the mucous membrane at its earliest stage, and it also has characteristics resembling each. I believe that it is generally preceded by a non-malignant lesion, such as a crust, wart, or fissure, or leukoplakia, and an epithelioma develops because these precancerous lesions have been neglected or improperly treated.

Dr. Vastine and I reported before the Radiological Section of the A. M. A. in 1931² on 253 cases of epithelioma of the lip taken from my private records extending from 1902 to 1930, during a period of twenty-eight years. There were 140 cases in which the primary lesion was not more than 1.5 cm. in diameter, and in this group we had only one failure, or 99 per cent of apparently permanent recoveries of from one (now two) to twenty-eight years. In the one case that terminated fatally, through a misunderstanding the patient did not receive our routine high voltage irradiation of the mental, sub-mental and sub-maxillary lymphatics. This patient had the local lesion destroyed, and the area remained well, but the patient returned in about a year with fixed, adherent, infiltrating lymph nodes which we were not able to cure, and he died, September 5, 1923, nearly four years after first coming under our care. We believe that this death could have been prevented by our routine associated prophylactic irradiation, if it had been given at the beginning.

We realize that many and possibly most of this group of cases had no lymphatic invasion, and we know that palpable lymph nodes do not always mean metastatic car-

²Pfahler and Vastine:—*J. A. M. A.*, Jan 2, 1932, Vol. 98, pp. 32-35.

cinoma; but the facts that metastasis developed in this single case in which our prophylactic irradiation had been omitted, and that metastases are common after a simple excision of the local lesion or after local destruction by cancer pastes in cases in which no prophylactic irradiation has been given, and that no harm is done by the irradiation, have convinced us of the value of prophylactic irradiation to the associated lymphatics as a routine procedure.

We have treated fifty-eight primary cases in which the local lesion was more than 1.5 cm. in diameter but in which there were still no palpable nodes at the time when the patient came for treatment. Recovery occurred in 83 per cent of the fifty-eight cases. Some of these cases were far advanced.

Our records show *thirty-nine primary cases in which there were palpable lymph nodes*. Recovery occurred in 56 per cent. This shows only a little more than half as many recoveries as we obtained in the early lesions with no palpable lymph nodes and it shows the importance of early and thorough treatment. Even 56 per cent is higher than is obtained by extensive surgical dissections.

We have treated seventy patients with cancer of the lip who were sent to us because of *recurrent lesions* or because of lesions that had been incompletely removed by excision or electrocoagulation (thirty cases), or by chemical destruction (twenty-seven cases), or which had been unsuccessfully treated by x-rays or radium (thirteen cases). In this group of recurrent cases, we have obtained only 71 per cent of recoveries, while in the total of all other cases we obtained 95.5 per cent. The recurrent cases are always more difficult to manage and require much more detailed work with a greater chance of ultimate failure.

We believe that if patients understand that they can be treated for cancer of the lip in the early stage and while the lesion is small, without undergoing an extensive operation, they will apply to the physician earlier for treat-

ment while they can be cured. In the advanced stage and when there are extensive metastases cancer of the lip is a very serious matter.

TABLE NO. 1

RESULTS IN TWO HUNDRED AND FIFTY-THREE CASES OF EPITHELIOMA OF THE LIP

Females 32 = 12%	Male 238 = 88%	Total 270	
Treatment carried to a conclusion		253	
Advanced and hopeless cases in which treatment was not advised		17	
	Total	270	
Classification According to Results of Treatment			
		Cases	
Living and free from evidence of disease (Counting all cases) .	212 =	84%	
Dead from carcinoma	29 =	11%	
Well when last seen—not traceable now	12 =	5%	
	Total	253 =	100%
Omitting the 12 cases not traceable, but probably well—Recovery..	88%		
	Dead.....	12%	
Classification According to Extent of Disease			
	Recoveries	Dead from Total	
		Cancer	
Local lesion, 1.5 cm. or less in diameter....	139 = 99%	1 = 1%	140
Local lesion, extensive, i.e., more than 1.5 cm. in diameter	48 = 83%	10 = 17%	58
Cases in which there were palpable lymph nodes	22 = 56%	17 = 44%	39
Postoperative irradiation given before recurrence	3 = 75%	1 = 25%	4
	Total	212	29 241
	Recoveries	Dead from Total	
		Cancer	
Cases with no palpable lymph nodes	187 = 94.4%	11 = 5.6%	198
Cases with palpable lymph nodes	22 = 56%	17 = 44%	39

Cancer of the Mouth—We believe that most cancers of the mouth can be prevented by eliminating all forms of irritation, such as come from tobacco, jagged or sharp-edged teeth, infected gums, badly fitting plates, or foreign bodies held in the mouth, and by eliminating syphilis.

The best time to cure cancer of the mouth even by irradiation is in its earliest stages. Cancer of the mouth can not be treated by rule. Each is an individual problem, for no two cases are alike. Therefore any statistics of results obtained from any form of treatment, or any special technique, will depend in great part upon the classification of the cases, or the stage of the disease when treatment was begun. In a previous paper,³ Dr. Vastine and I described our technique and our personal results. From these studies, and with our present technique, we believe that about 50 per cent can be gotten well if treated completely and skilfully when they first consult a physician.

The results on patients as they reach the radiologist today are much less satisfactory than the above estimate, and when the five-year cures of all cases coming to a clinic are counted, they are for the tongue, 22 per cent (Quick) to 32 per cent (Berven); for the floor of the mouth, 34 per cent (Berven); for the mandible 18 per cent (Berven); for the cheeks 26 per cent (Berven). Much depends upon the extent of the disease when treatment is begun. In the early cases (without metastases) Berven obtained 59 per cent, and for the late cases 0 per cent in cancer of the tongue.

In carcinoma of the tonsils, with telerradium, Berven obtained 39 per cent of three-year cures.

In cases of carcinoma of the upper jaw with the most modern irradiation associated with minor surgical operations, about 35 per cent can be expected to recover (Crosby-Green, Berven, New).

In general, when treating cancer of the mouth and jaws individualization is absolutely essential, and radium, when used skilfully and in sufficient quantity has been found more efficient than the X-rays.

Cancer of the Uterus, which comprises about 30 per cent of all cancers (Birch-Hirschfeld, Arth. Welch), is in great

³Pfahler & Vastine:—Radiation Therapy in Cancer of the Mouth, *J.A.M.A.* Feb. 23, 1931, Vol. 96, 664.

part a preventable disease if we utilize all of the knowledge now available. It is believed by most investigators that cancer of the cervix—which forms about 90 per cent (Koblanck) of the cancers of the uterus (5 out of 6, Bland)—develops upon a preceding cervicitis. The cervicitis is caused by local infections, and especially develops after lacerations incident to childbirth. Farrar found that 96 per cent of his cases of cancer of the cervix had borne children. Bland says, "Injuries of the cervix inflicted during childbirth, followed by eversion, erosion and long-continued irritation and finally culminating in metaplasia of the endocervix form the propitious background for the ultimate development of cervical cancer." Pemberton found only 5 carcinomas in 5,962 patients upon whom trachelorrhaphy, cervical amputation or cauterization had been performed. Smith found only 6 cancers in 3,650 patients who had their cervix repaired, and on the other hand of 498 cervical cancers, 486 had not had any repair of the cervix. Of 1,150 patients who had the cervix cauterized not one developed cancer. Huggins reports 2,985 cases of chronic cervical disease treated by cauterization or excision by the endothermic knife without a single case of cancer developing thereafter. Therefore, by repairing lacerations and following all childbirths until the cervix is healthy, and by treating all cervicitis, most of these cancers of the cervix can be prevented. This requires the education of the laity as to the importance of examining by palpation and inspection any case in which there is any unnatural vaginal discharge, and especially, after the age of 35, to have such examinations twice a year. Recently it has been claimed that when the cervix is painted with a 3 per cent aqueous solution of iodine the part involved by early cancer will not be stained (W. Schiller). I have not been able to confirm this in all cases.

It is now pretty generally recognized that cancer of the cervix is best treated by irradiation in any stage of the disease, when the equipment and the necessary professional and radiological skill are available. When these factors

are missing, and surgical skill is available, then surgery is best. Surgery can only be used in about three-tenths of the cases, as they now come to any large public clinic. Seventenths are inoperable, and their only hope of recovery is from the skilful application of both radium and deep roentgentherapy. It is hoped that as the patients and the physicians become more alert, a greater percentage of early cases will come under skilful radiological treatment.

The surgical technique has been completely developed and has been available for about twenty-five years; while the radiological technique is still undergoing improvement and has been only fairly well developed during about fifteen years. The fact that such able teachers and operating gynecologists as Kelly, Clark, Polak, Norris, Healy, Lynch, Ward, Anspach, Schmidt and others, have abandoned operation in favor of irradiation is in itself significant.

According to the statistics prepared by Seiffert from the Döderlein Clinic in Munich, it was found that of patients with carcinoma of the cervix treated by irradiation in the operable stage, and who followed through the complete treatment, 80 per cent were well at the end of five years. This then is the best chance for the woman who comes early and has a thorough and complete treatment by irradiation. The general results from irradiation, however, in operable cases were only 46 per cent of cures, due to the fact that some patients interrupted the treatment.

In a report from the Ministry of Health in London published in 1927, Dr. Lane-Claypon published the statistics of 6,661 cases of cervical carcinoma operated upon by vaginal or abdominal hysterectomy and found 2,227 were alive at the end of five years, making only 34.1 per cent. On the other hand, she found 1,117 "operable" cases which were treated by irradiation, and 400 were alive at the end of five years, which is 35.8 per cent. Counting all cases that presented themselves to the *surgical clinics*, operable and inoperable, she found that 18.3 per cent were alive at the end of five years, while irradiation in a similar group

gave 22 per cent of five year results. According to these general (London) statistics, therefore, the radiologic treatment showed slightly better results in the same class of cases, even though the radiological treatment was in the developmental stage, and of course operative mortality was avoided.

Ward and Farrar reported 134 cases treated by irradiation from 1919 to 1923, and obtained 53.1 per cent five year cures in the "operable" and "borderline" cases. Heyman reported in 1927 from the Radiumhemmet on 145 "operable" and "borderline" cases in which they obtained 46.2 per cent cures. The percentage of cures counting all cases showed a progressive increase as the technique was improved: 1920=10 per cent; 1921=17 per cent; 1922 and 1923=36 per cent. For stage I=86 per cent; for stage II=42 per cent and for stage III=30 per cent. I am sure that future statistics will show even better results because of improved technique, and a better education of the public. At the Marie Curie Hospital (Editorial, *British J. Rad.* August 1932) in Paris, 587 cases of cancer of the cervix which were treated during the six years previous to 1931 showed 342 or 58 per cent were alive at the end of 1931, or more than one year. Recently before the British Medical Association Centenary Meeting, Voltz of Munich reported on 1,723 cases treated between 1913 and 1926, in which an absolute cure of 18.5 per cent was obtained; Group I—43.2 per cent, Group II—22.5 per cent; Group III—12.1 per cent and IV—2.1 per cent. For the last two years of that period the five year cure rate was 25 per cent. At the same meeting, Lacassagne reported from the Institut du Radium on 678 cases with a five year cure rate on all cases of 26 per cent. Results improved as the technique was improved. Cases treated in 1921 to 1923 inclusive showed 30 per cent five year cures, and 1924 to 1926, the cures counting all cases had risen to 36 per cent. The keynote of success is therefore early diagnosis and thorough, skilful treatment with the most modern technique.

At Erlangen during the years 1921-1926, by the X-rays

alone the absolute cure rate was 20.9 per cent. By the modern technique Voltz reports the cure rate for Group I as 58 per cent, and for Group II 29 per cent. This indicates definite progress from irradiation therapy. For the inoperable cases, there is a 12 per cent cure rate.

In the treatment of cancer of the cervix by irradiation we must not only consider the curative value which is about 25 per cent of all cases, but we must take into account the *palliative value* in advanced cases until we can get all patients to come for treatment while in the earliest stage, when the curability with our best management will run from 50 per cent to 80 per cent. Heyman in reviewing the 1,237 cases treated at the Radiumhemmet, 1914 to 1926, reports 90 per cent were relieved from bleeding for shorter or longer periods; cessation of offensive discharge was obtained in over 50 per cent; while close on 50 per cent were relieved of their pain and about 60 per cent were able to return for a shorter or longer time to their usual occupations.

Cancer of the Body of the Uterus—In most of the statistical reports on cancer of the uterus, cancer of the body makes up about 10 per cent. Of 80 cases treated by irradiation at the Radiumhemmet between 1914 and 1926, Heyman reported 42.5 per cent five year cures. He states however that this material contained an unusually large percentage of inoperable cases. He further states, "The idea that adenocarcinoma should be resistant to radium treatment is in our opinion not tenable. (Healy is of the same opinion). The treatment of carcinoma in the body of the uterus differs but little from the treatment of the same disease in the cervix." Voltz reporting from the Munich Clinic on 107 cases treated by irradiation between 1913 and 1926, shows 45.8 per cent five year cures—66 per cent for the "operable," and 14.3 per cent for the "inoperable," while for the later date, 1921 to 1926, the cure-rate was 62 per cent instead of 45.8 per cent. It would seem therefore that in carcinoma of the cervix *with the most modern technique*, 86 per cent can be cured in Stage I; 42

per cent in Stage II, and 30 per cent in Stage III, and about 62 per cent of all the carcinomas of the body of the uterus can be gotten well with the most modern technique. This of course refers only to the most skillful work.

TREATED BY IRRADIATION—5 YEAR CURES

CANCER OF THE CERVIX				
Author	No. Cases	Date	All Cases Absolute Cures	Groups
Voltz	973	1913-26	18.5	I — 43.2%
"	"	"	"	II — 22.5%
"	"	"	"	III — 12.1%
"	"	"	"	IV — 4.9%
"	404	1924-26	25	I — 49.4%
"	"	"	"	II — 23.1%
"	"	"	"	III — 17.9%
"	"	"	"	IV — 4.9%
Lacassagne	678	1919-26	26%	
"	"	1924-26	36%	I — 86%
"	"	"	"	II — 42%
"	"	"	"	III — 30%
Ward	343	1919-27	23.8%	I & II — 53.2%
Hurdon	74	1925-30	26%	
Heyman	1237	1914-26	20%	I — 40.8%
"	"	1914-26	20%	II & III — 15.7%
Healy	1574	1918-30	22.5%	I — 55.0%
"	"	"	"	II — 34.0%
"	"	"	"	III — 15.0%

CARCINOMA OF THE CORPUS UTERI

Voltz	107	1913-26	45.8 — "Operable" 66%
"	39	1921-26	62%
Heyman	80	1914-26	42.7%

CANCER OF THE OVARIES

Heyman	134	1914-26	
"	24	"	Inoperable — Irradiation 8.5%
"	36	"	Incomplete op. " 22.0%
"	28	"	Recurrent " 25.0%
"	46	"	Prophylactic — Post-op. irradiation 54.0%

Cancer of the Breast—Until recently, cancer of the breast has been looked upon as a surgical condition primarily, and operation has been almost universally recommended if the disease was in an operable stage, and there was present no definite contra-indication to operation. At

present, some rather encouraging results are being obtained by thorough and skilful irradiation by the method of Keynes and applied even in operable cases of cancer of the breast, but the method is still in the developmental and research stage, and there are not available statistics on five year cures.

Most of the irradiation in the past has been given as a post-operative treatment, and for recurrences, and for advanced primary carcinoma. With the object of estimating the value of this irradiation, I reviewed a year ago, 1,022 of my private cases of carcinoma of the breast treated during 26 years, by technique in the process of evolution, and all treated more than four years ago.

Time will not permit a detailed discussion of these cases, but for our purposes tonight, it should be noted that in the "post-operative group," 55 per cent of all these cases were symptom free more than five years, and of the cases that had glandular involvement at the time of operation, there were 46.6 per cent symptom free more than five years, which is more than twice the number that recover from operation alone. We are not yet in a position to draw conclusions regarding the primary irradiation of operable carcinoma of the breast, but surely we can accomplish much in prolonging life and increasing comfort with some cures in the inoperable group. Taking all cases including the advanced primary and the recurrent that received irradiation, there were 36 per cent of five year recoveries. This is a creditable showing but by no means sufficient.

STATISTICAL STUDY OF IRRADIATION IN CARCINOMA
OF THE BREAST (1,022 CASES).
1902 TO JUNE, 1928.

Group		Total	Well over five years.		
a. Cases receiving both preoperative and postoperative irradiation (92 cases)					
A	I Op. no invol. of gl.....	20	10	of 17	58%
B	II Op. with invol. of gl.....	37	19	of 33	57%
C	IV No gl. at op.—gl. after op.....	19	7	of 17	41%
D	IV Gl. at op. and gl. after op.....	19	3	of 11	27%
		—	—	—	—
Total and Average.....		95	39	of 78	50%

b. Cases receiving postoperative irradiation (263 cases)				
E I	No gl. op.—no gl. when irradi.....	60	43 of 49	87%
F II	Gl. op.—no gl. when irradi.....	100	57 of 98	58%
G IV	Gl. op.—gl. when irradi.....	76	24 of 70	34%
H IV	No gl. op.—gl. when irradi.....	27	8 of 23	34%
		—	—	—
Total and Average.....		263	132 of 240	55%
c. Recurrent cases treated by irradiation (433 cases)				
I III	Local recurrence.....	62	29 of 62	46%
J IV	Rec. gl. ax. and s.cl.....	69	14 of 65	21%
K IV	Rec. met. med. and lungs.....	31	4 of 30	13%
L IV	Rec. ax. and s.cl. and med.....	220	29 of 210	13%
M IV	Loc. les., met. spine and bones.....	19	4 of 14	28%
N IV	Met. med.—lungs and bones.....	32	1 of 27	3%
		—	—	—
Total and Average		433	81 of 408	17%
d. Primary inoperable cases treated by irradiation (178 cases)				
O IV	Fix. sk. or gl. and ax. s.cl. and med....	117	27 of 108	25%
P IV	Fix. sk. or gl. and ax.s.cl. and b. met..	33	7 of 23	30%
Q IV	Made op. without chest met.....	20	11 of 19	57%
R IV	Made op. with chest (pall. op).....	5	2 of 5	40%
S IV	Remov. by electrocoagulation.....	3	1 of 3	33%
		—	—	—
Total and Average.....		178	48 of 158	30%
e. Primary operable cases treated by irradiation (53 cases)				
T I	Prim. op. unques. malig. (refused or phys. not fit).....	40	30 of 37	81%
V I	Prim. op. quest. malig. (1% of all cases)	13	10 of 13	76%
		—	—	—
Total and Average.....		53	41 of 50	82%
		—	—	—
Grand Total and Average 1,022			341 of 934	36%

Cancer of the Tonsil, Pharynx, and Larynx.—Epitheliomas of the tonsillar regions as they reach the radiologist usually involve the tonsil and tonsillar pillars, and in about half of the cases extend to the palate and uvula, and frequently, to the tongue and epiglottis. The metastatic nodules usually are found under the angle of the jaw. Of 46 cases treated by irradiation by Coutard, 26 per cent were well two years, and 23 per cent were well after five years.

Epitheliomas of the hypopharynx usually involve the

postero-inferior edge of the tongue and extend to the epiglottis, and to the aryteno-pharyngo and glosso-epiglottic folds. In 89 cases, Coutard obtained 20 per cent of cures for two years, but at the end of five years only 10 per cent remained well. This low percentage of recoveries is probably due to the advanced disease, for it has seemed to me that this group of cases are especially radio-sensitive.

Carcinoma of the larynx is now definitely a radiological problem, and we believe that all extrinsic cases are best treated by irradiation. Coutard has had most experience and treats by means of highly filtered high voltage X-rays. It has seemed to me that better results are obtained by highly filtered gamma rays, and with little or no damage to the normal tissues. He has treated 77 cases with 32 per cent symptom free at the end of two years, and 28 per cent at the end of five years. This is a great gain over our former results, and with further development of technique and the treatment in an earlier stage, better results may be expected.

Cancer of the lungs seems to be on the increase. The roentgenologist is very essential in diagnosing the disease; in determining its extent; and in studying the progress made by any form of treatment. The treatment is entirely by irradiation, and while the difficulties of irradiation are great, some encouraging results have been obtained. Leddy has recently reported upon 42 cases treated by the high voltage roentgen rays, and in 10 cases he obtained at least palliative results lasting from fifteen months to four years.

Malignant disease of the lymphatics in general is radio-sensitive, and our most brilliant local results are obtained in these cases, but the very conditions that make this type of tumor radio-sensitive also make it spread rapidly through the system, and our failure to obtain many permanent cures in these cases is not due to the local disease, but due to the distant metastases which ultimately are apt to get beyond our control. Our hope in this group is in treating very thoroughly while the disease is local and in treating the neighboring areas so as to avoid extensions.

Malignant disease of bone has not been treated extensively enough by irradiation to establish any reliable statistics.

Metastatic carcinoma of bone responds to irradiation sometimes brilliantly, and patients with extensive disease may sometimes be kept in comfort and apparent health for five years, but I know of no permanent cures, and generally, one can only hold the disease for about two years.

In osteogenic sarcoma some encouraging results have been obtained, but it seems that early amputation, or according to my experience, preliminary irradiation and then amputation gives the best results.

In giant cell bone tumors very satisfactory results have been obtained. While it requires from one to five or more years for recalcification, the function of the extremity is retained throughout the treatment, or is soon restored. A spontaneous or traumatic fracture is no contra-indication to the treatment, and we therefore believe irradiation to be the best available treatment.

In the malignancies of the alimentary canal very little has been accomplished by irradiation. A few scattered cases seem to have been cured, but certainly there should be no delay in any operable case.

In brain tumors some excellent results have been obtained in the irradiation of the sellar adenomas, but elsewhere, our results have been mostly palliative.

I have omitted from this brief summary all reference to etiology, diagnosis or technique, all of which are very important. As our equipment and technique improve, and the public have eliminated the fear of operation, and learn the importance of early treatment, our statistical results will surely improve.